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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,326	09/27/2006	Driss Stitou	032013-129	8226

23911 7590 08/05/2009
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EXAMINER	
CARTON, MICHAEL	
ART UNIT	PAPER NUMBER
3744	
MAIL DATE	DELIVERY MODE
08/05/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/549,326	STITOU ET AL.	
	Examiner	Art Unit	
	MICHAEL CARTON	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/16/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 12-15 disclose both the regeneration and the refrigeration phases as endothermic and both releasing fluid in gas form. It is not clear from the specification, claims, or drawings how both phases can be endothermic. Further clarification is required. For examining purposes, examiner interprets the limitations to mean the refrigeration step absorbs thermal energy while the regeneration step releases thermal energy.

Claim Objections

3. Claims 1-24 are objected to because of the following informalities:

The recitation of "said phenomena" in claim 1, lines 4 and 6 is presumed to mean -said physico-chemical phenomena-. Additionally, claim 1 recitation of "said phenomena being exothermic in one direction and endothermic in the other direction, called the LT phenomenon and the HT phenomenon" in claim 1, lines 4-5 would be clarified with the addition of –respectively- at the end of the sentence.

With respect to claim 3, the recitation of "separating the pieces of ice from the support", claim 3 lines 3 and 4, is presumed to mean -separating pieces of ice from a support-.

With respect to claim 4, the recitation of "the hot gas", claim 4 line 3, is presumed to mean -a hot gas-.

With respect to claims 6 and 7, recitation of "step A1", "step D", and "step C" are presumed to mean "phase A1", "phase D", and phase C" as recited in parent claim 2.

With respect to claim 9 recitation of "a second line" and "a first line", claim 9 lines 5 and 7, respectively are presumed to mean -a first line- and -a second line-, respectively (the order is reversed).

Claim 9 further recites "isolating it" in line 11. The claim should positively recite what "it" refers to.

Claim 9 further recites "it contains a liquid sorbent", "thermally isolating it", and "it contains the liquid form" in lines 9-12. "It" is presumed to mean -the reactor-.

Additionally, Claim 9 also is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 9 recites "A device for implementing the method as claimed in claim 1" in line 1. It is unclear if claim 9 depends from claim 1, or if it is independent. For examination purposes, examiner interprets claim 9 as independent.

With respect to claim 14 recitation of "the boiling refrigerant fluid", claim 14 line 3 is presumed to mean -a boiling refrigerant fluid-.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith (US Patent no. 1932492).

With respect to claim 1, Smith discloses a method for rapid refrigeration (page 2 lines 129-133) at a useful temperature (page 1 lines 1-2 disclose the apparatus produces refrigeration, which is interpreted to mean useful temperature as lower temperatures than ambient air are generally useful for food preservation), which employs a thermo chemical system (page 2 lines 41-45) based on the coupling of reversible physico-chemical phenomena between a gas and a solid or liquid sorbent (page 1 lines 1-7), said physico-chemical phenomena being exothermic in one direction (page 1 lines 42-46) and endothermic in the other direction (page 1 lines 38-42), called the LT phenomenon and the HT phenomenon respectively, said physico-chemical phenomena being such that, at a given pressure, the equilibrium temperature of the LT phenomenon is below the equilibrium temperature of the HT phenomenon (column 2 lines 81-89), said method comprising consisting in carrying out at least one cycle consisting of a refrigeration step (page 1 lines 72-73) and a regeneration step (page 1 lines 29-33) starting from an initial state in which a reactor 10 (fig 1) in which the LT phenomenon occurs and a reactor 14 (fig 1) in which the HT phenomenon occurs are at the ambient temperature and isolated from each other (reactor 10 and reactor 14 are isolated by being separated as disclosed in fig 1), the

refrigeration step consisting of the endothermic phase of the LT phenomenon, which releases a refrigerant fluid G (any of the fluids listed in page 2 lines 76-87) in gas form (page 2 line 75), the regeneration step consisting of the endothermic phase of the HT phenomenon (page 1 lines 42-45), which releases the fluid G in gas form (page 1 lines 62-67), wherein in said method: the LT phenomenon is a liquid/gas phase change of the fluid G (disclosed in page 1 lines 38-42 as a distillation cycle which necessarily includes a phase change); the HT phenomenon is a sorption of the fluid G by a solid sorbent (page 1 lines 29-34); the endothermic phase of the LT phenomenon takes place in a reactor 10 (fig 1) thermally isolated from the ambient environment (isolated by heater 16 and cooler 17 in fig 1); and the exothermic phase of the LT phenomenon takes place in a condenser 12 (fig 1) in permanent communication (via refrigerant line 13 in fig 1) with the reactor 14 (fig 1) in which the HT phenomenon takes place, the condensed fluid G then being transferred into the reactor 10 (fig 1) in which the endothermic phase of the LT phenomenon takes place (page 2 lines 113-121).

With respect to claim 8, Smith discloses the method as claimed in claim 1, wherein the reactor 10 (fig 1) in which the HT phenomenon takes place and the condenser 12 (fig 1) are permanently in communication with each other (via line 11 in fig 1).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2, 6-7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US Patent No. 1932492 in view of Castaing (US patent no. 5445217).

With respect to claim 2, Smith discloses the method as claimed in claim 1, wherein: the refrigeration step comprises: a phase A1 during which the reactor 14 (fig 1) in which the HT phenomenon takes place and the reactor 10 (fig 1) in which the LT phenomenon takes place are placed in communication with each other (see fig 1); and the HT reactor is heated (page 3 lines 9-10); and the regeneration step comprises a phase C during which the HT reactor is heated (page 3 lines 9-10) and in permanent communication (through line 11 in fig 1) with a condenser 12 (fig 1); a phase D consisting in transferring the fluid G (refrigerant in page 2 line 76) in liquid form from the condenser to the LT reactor (page 2 lines 116-121); and a phase E consisting in cooling the HT reactor in order to return it to the initial conditions (page 2 lines 121-129). While Smith teaches the reactor 10 (fig 1) is heated by heater 16 (fig 1) it is not explicitly disclosed as heated when the HT and the LT reactors are isolated from each other. Castaing discloses reactors 14 and 16 (fig 2a) connected to evaporator reactor 18 (fig 2a) with a valve 34 (fig 2a) to selectively make reactors 14, 16 (fig 2a) and evaporator reactor 18 (fig 2a) isolated or in communication. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith by having reactor 10 (fig 1) and reactor 14 (fig 1) isolated from each other, when heating the HT reactor, with a valve as taught by Castaing for the purpose of ensuring a more complete cooling step in the evaporator by having the contents of the evaporator isolated from any other elements in the system when heat is being generated.

With respect to claim 6, Smith discloses the method as claimed in claim 2, wherein, during phase A1, the heat generated by the exothermic step in the HT reactor 10 (Smith: fig 1) is

extracted (Smith: page 2 line 149-page 3 line 3, stating once fluid is heated, it is necessarily extracted).

With respect to claim 7, Smith discloses the method as claimed in claim 2, wherein phase D is carried out during execution of phase C (Smith discloses heating the reactor 10 (fig 1) when the refrigerant is passed to condenser 12 (fig 1) in page 2 lines 113-120).

With respect to claim 9, Smith discloses a device for implementing the method as claimed in claim 1, wherein the device comprises: a first reactor 10 (fig 1) and a second reactor 14 (fig 1) and a condenser 12 (fig 1) provided with means for extracting the heat (obvious to one of ordinary skill in the art at the time of the invention to use air flow for the purpose of cooling a coil condenser); the second reactor is connected to the condenser via a second line 13 (fig 1); the condenser is connected to the first reactor via a first line 11 (fig 1); the first reactor is provided with heating means 16 (fig 1) and with means for extracting the heat 17 (fig 1), and the first reactor contains a liquid sorbent (page 1 lines 17-20) capable of reversibly sorbing a refrigerant fluid G; and the second reactor includes means for thermally isolating the second reactor from the ambient medium 63 (fig 3, and also discloses on page 4 lines 7-8), and the reactor contains the liquid form of the refrigerant fluid (page 4 lines 17-18). Smith does not expressly disclose a valve connecting the second reactor to the second line. Castaing discloses a valve 34 (fig 2a) connecting a reactor 18 (fig 2a) to line 56 (fig 2a). It would have been obvious to one of ordinary skill in the art to modify Smith with a valve as taught by Castaing in order to selectively allow refrigerant to pass between the reactor and condenser allowing the user to have greater control over the refrigeration.

With respect to claim 11, Smith discloses the device as in claim 9, wherein the second reactor 14 (fig 1) is an evaporator (page 2 line 61).

8. Claims 3-4, 12-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US Patent No. 1932492) and Castaing (US Patent No. 5445217) in view of Broadbent (US Patent No. 6205807).

9. With respect to claim 3, Smith and Castaing disclose the method as claimed in claim 2, except wherein it comprises, using the apparatus to produce ice or an intermediate phase for separating pieces of ice from the support between passive refrigeration phase A2 and phase C of the regeneration step. Broadbent discloses using an evaporator to form ice, and also discloses a phase for removal of the ice following refrigeration (fig 9 discloses ice cubes 72 being separated from evaporator 26 following refrigeration of water which is disclosed in fig 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by using the apparatus to produce ice or an intermediate phase for separating pieces of ice from the support between passive refrigeration phase and phase of the regeneration step as taught by Broadbent for the purpose of forming consumable ice useful for cooling beverages without the noise compressors cause in a typical refrigeration process.

10. With respect to claim 4, Smith and Castaing disclose the method as claimed in claim 3, except wherein phase B consists in bringing the condenser into communication with the LT reactor for a short period so as to bring some of the hot gas released by the endothermic step of the HT reactor into proximity with the support on which the pieces of ice form. Smith does however disclose bringing the condenser 12 (fig 1) into communication with LT reactor 14 (fig 1). Broadbent discloses forming ice on evaporator, which is a result of the gasses from condenser

24 (fig 1) coming into proximity with evaporator 26 (fig 1) with includes a support 28 (fig 8) on which pieces of ice 72 (fig 8) form. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by bringing the condenser into communication with the LT reactor for a short period so as to bring some of the hot gas released by the endothermic step of the HT reactor into proximity with the support on which the pieces of ice form as taught by Broadbent for the purpose of cooling the evaporator/reactor so as to form ice from water added to evaporator without noises associated from compressors in typical vapor compression cycles.

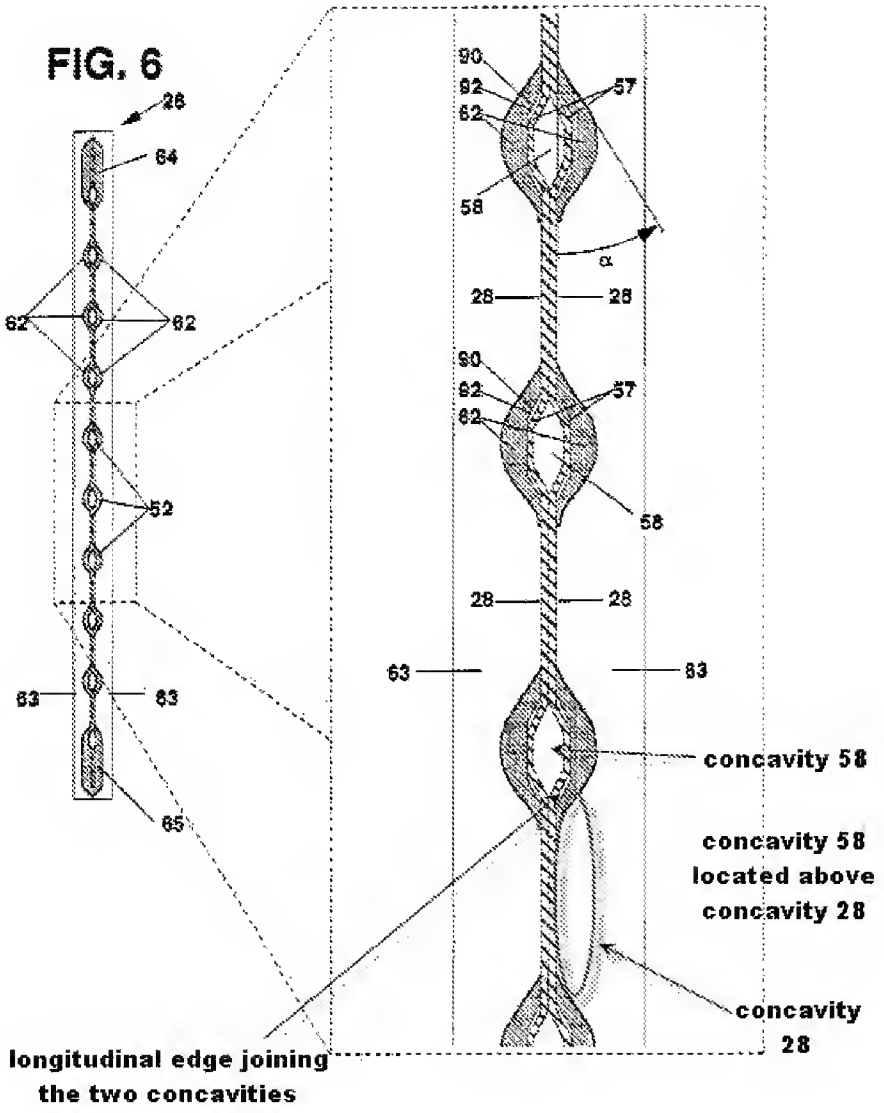
With respect to claim 12 Smith and Castaing discloses the device as claimed in claim 9, except wherein the second reactor is an evaporator provided with an ice tray. Broadbent discloses an evaporator 26 (fig 3) with an integrated ice tray 59 (fig 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having the evaporator integrated with an ice tray as taught by Broadbent for the purpose of forming consumable ice from an evaporator without noises associated from the moving parts of a compressor traditionally used in a vapor compression system.

With respect to claim 13, Smith and Castaing disclose the device as claimed in claim 12, except wherein the ice tray forms an integral part of the evaporator. Broadbent discloses an ice tray 59 (fig 3) forming an integral part of an evaporator (column 5 lines 53-62). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having the ice tray be an integral part of the evaporator as taught by Broadbent for the purpose of putting water in the ice tray in close proximity of the evaporator cooling the water in shorter time.

With respect to claim 14, Smith and Castaing disclose the device as claimed in claim 12, except wherein the ice tray is placed on a wall of the evaporator that is in contact with the boiling refrigerant fluid via fins. Broadbent discloses an evaporator 26 (fig 3) with an integrated ice tray 59 (fig 3) that contains fins (disclosed as ridges 63 in fig 5 which are interpreted as fins as the ridges increase the surface area of the evaporator as fins do, in order to increase thermal connection of the refrigerant inside the evaporator and the water) that ice cubes 72 (fig 8) form on. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith, Castaing, by having the ice tray is fixed to a wall of the evaporator that is in contact with the boiling refrigerant fluid via fins as taught by Broadbent for the purpose of increasing the thermal connection between the evaporator and the water which would allow faster phase change of liquid water to ice.

With respect to claim 15, Smith and Castaing disclose the device as claimed in claim 13, except wherein the evaporator is formed by two hollow sections that have different concavities and are joined together along their longitudinal edges, the section having the smaller concavity being placed above the section having the larger concavity, the respective concave parts being upwardly directed, the section having the smaller concavity forming the ice tray and the section having the larger concavity forming the reservoir for the refrigerant fluid. Broadbent discloses an evaporator 26 (fig 3) formed by two hollow sections 28, 58 (fig 6) that have different concavities and are joined together along their longitudinal edges (seen in annotated fig 6 below), the section having the smaller concavity being placed above the section having the larger concavity (looking at fig 6 concavity 58 is the highest concavity of the evaporator, while concavity 28 is below it), the respective concave parts being upwardly directed, Broadbent does

not specifically disclose the section having the smaller concavity forming the ice tray and the section having the larger concavity forming the reservoir for the refrigerant fluid. Broadbent discloses the section having the smaller concavity forming the reservoir 58 (fig 6) for refrigerant fluid while the section having the larger concavity 28 (fig 6) forms the ice tray. It would have been an obvious matter of design choice to the section having the smaller concavity forming the ice tray and the section having the larger concavity forming the reservoir for the refrigerant fluid, for the purpose of forming smaller ice cubes while having more refrigerant flowing through the tray freezing the cubes fast, since such a modification would have involved a mere change in the form or shape of a component. A change in form or shape is generally recognized as being within the level of ordinary skill in the art. In re Dailey, 149 USPQ 47 (CCPA 1976). Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing so that the evaporator is formed by two hollow sections that have different concavities and are joined together along their longitudinal edges, the section having the smaller concavity being placed above the section having the larger concavity, the respective concave parts being upwardly directed, the section having the smaller concavity forming the ice tray and the section having the larger concavity forming the reservoir for the refrigerant fluid as taught by Broadbent for the purpose of freezing ice cubes on the ice tray as water runs off the evaporator with the aid of gravity allowing inclusion free ice to form.



With respect to claim 16, Smith and Castaing discloses the device as claimed in claim 15, except wherein the concavities are formed by portions of elliptical arcs of different diameters, the sections being portions of longitudinally truncated tubes of cylindrical or elliptical cross-section. Broadbent discloses concavities 58, 28 (annotated fig 6 above) formed by portions of elliptical arcs of different diameters (ellipse shown as marked in red in fig 6 above, while

concavity 58 in fig 6 is a generally elliptical), the sections being portions of longitudinally truncated tubes of elliptical cross-section (fig 3 discloses the portions 28 and can be seen as truncated by fins 63 while portion 58 in fig 6 is truncated at insulation members 66 and 67 in fig 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing so that concavities are formed by portions of elliptical arcs of different diameters, the sections being portions of longitudinally truncated tubes of elliptical cross-section as taught by Broadbent for the purpose of forming a smooth radiused ice cube which is easier to eject from a tray than a square shaped cube.

With respect to claim 17, Smith and Castaing disclose the device as claimed in claim 15, except wherein the sections are in contact with each other along their lower generatrices. Broadbent discloses sections 28, 58 (fig 6) that are in contact with each other along their lower generatrices (indicated by longitudinal edges in annotated fig 6 above). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing so that the sections are in contact with each other along their lower generatrices as taught by Broadbent for the purpose of putting the refrigerant in thermal communication with the concavity that holds water in order to cool the water to form ice.

With respect to claim 18, Smith, Castaing disclose the device as claimed in claim 12, except wherein the ice tray is divided into compartments by partitions. Broadbent discloses an ice tray that is divided into compartments 28 (fig 3) by partitions 63 (fig 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having the ice tray divided into compartments by partitions as taught by Broadbent for the purpose of being able to separate individual, small ice cubes from the ice tray.

With respect to claim 19, Smith, Castaing disclose the device as claimed in claim 18, except wherein the partitions are hollow and contain a phase change material. Broadbent discloses partitions 63 (fig 3) that are hollow as seen in fig 6, and are designed to be filled with water (inherent to an ice tray). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having the partitions hollow and filed with water as taught by Broadbent for the purpose of forming individual ice cubes in the evaporator.

With respect to claim 20, Smith and Castaing disclose the device as claimed in claim 15, except wherein the lower section provided with cells filled with a phase change material. Broadbent discloses the lower section 28 (fig 6) is provided with cells 70 (fig 7) filled with a phase change material (water shown as 28 in fig 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing to have the lower section provided with cells filled with a phase change material as taught by Broadbent for the purpose of surrounding the water in the ice tray with heat absorbing refrigerant in a more efficient manner allowing quicker ice formation.

With respect to claim 21, Smith and Castaing disclose the device as claimed in claim 18, except wherein the partitions include notches. Broadbent discloses partitions 63 (fig 3) which includes notches 62 (fig 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having the partitions include notches as taught by Broadbent for the purpose of positively defining the water freezing sites allowing a controlled shape of ice cubes to form.

With respect to claim 22, Smith and Castaing disclose the device as in claim 15, except wherein fins are placed in the space between the two sections. Broadbent discloses fins 57 (fig 7) placed in the space between the two sections (fins 57 are disclosed by Broadbent as tube walls and are interpreted as fins as the tube walls increase the surface area of the evaporator as fins do, in order to increase thermal connection of the refrigerant inside the evaporator and the water). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having fins placed in the space between the two sections as taught by Broadbent for the purpose of having effective thermal transfer between the area where water is placed and where refrigerant flows lowering the time needed to form ice from liquid water.

With respect to claim 23, Smith and Castaing disclose the device as claimed in claim 22, wherein except the fins are hollow and contain a phase change material. Broadbent discloses fins 57 (fig 7) that are hollow and contain a phase change material 71 (fig 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing to have fins that are hollow and contain a phase change material as taught by Broadbent for the purpose of allowing the evaporator to effectively transfer heat by flowing refrigerant through fins causing shorter times to form ice.

With respect to claim 24, Smith and Castaing disclose the device as claimed in claim 14, except wherein the ice tray is formed by a container; said container is provided with a thermal insulation placed around its periphery; said container is capable of being removable and fits onto the lower part of the evaporator, which also includes a thermal insulator; the evaporator is provided with external fins that are immersed in the ice tray and with internal fins; and the evaporator is provided with a pipe for connecting it to the rest of the device. Broadbent discloses

the ice tray is formed by a container 59 (fig 3); said container is provided with a thermal insulation 66, 67 (fig 3) placed around its periphery; said container is removable (column 6 lines 17-25 indicating container 59 is attached, and is interpreted as the attaching means may be removed) and fits onto the lower part of the evaporator (shown being attached in fig 3 in lower part of evaporator), which also includes a thermal insulator 66 (fig 5); the evaporator is provided with external fins 63 (fig 5) that are immersed in the ice tray and with internal fins 62 (fig 5) (fins 62 and 63 are disclosed by Broadbent as vertical and horizontal ridges and are interpreted as fins as the ridges increase the surface area of the evaporator as fins do, in order to increase thermal connection of the refrigerant inside the evaporator and the water); and the evaporator is provided with a pipe 55 (fig 5) for connecting it to the rest of the device. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith and Castaing by having the ice tray formed by a container; said container is provided with a thermal insulation placed around its periphery; said container is removable and fits onto the lower part of the evaporator, which also includes a thermal insulator; the evaporator is provided with external fins that are immersed in the ice tray and with internal fins; and the evaporator is provided with a pipe for connecting it to the rest of the device as taught by Broadbent for the purpose of forming ice cubes in an evaporator of a cooling system, the ice cubes being easily separable from each other via removable fins.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US Patent No. 1932492, Castaing (US patent no. 5445217), and Broadbent (US Patent No. 6205807) in view of Shapiro (US Patent No. 6357720).

12. With respect to claim 5, Smith, Castaing and Broadbent disclose the method as claimed in claim 3, except wherein phase B is implemented using electrical resistance elements integrated into or attached to the wall of the LT reactor near the ice support. Broadbent teaches of an evaporator 26 (fig 3) which is also an ice tray. Shapiro discloses using electrical resistance elements 46 (fig 5) located in ice cube support trays 28 (fig 5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith, Castaing and Broadbent by using electrical resistance elements integrated into or attached to the wall of the LT reactor near the ice support as taught by Shapiro for the purpose of making it easier to eject the ice cubes from the tray and also to form a strong temperature gradient from the top to the bottom of each ice cube cell which forms clear cubes free of any inclusions, which consumers prefer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL CARTON whose telephone number is (571)270-7837. The examiner can normally be reached on Monday-Friday 7:30am - 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler or Frantz Jules can be reached on (571)272-4834 or (571)272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. C./
Examiner, Art Unit 3744

/Cheryl J. Tyler/
Supervisory Patent Examiner, Art Unit 3744